

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 1 077 198 A3

(12)

EUROPEAN PATENT APPLICATION

(88) Date of publication A3:

07.03.2001 Bulletin 2001/10

(51) Int. Cl.⁷: **C01B 3/40**, **C01B 3/38**

(43) Date of publication A2:

21.02.2001 Bulletin 2001/08

(21) Application number: **00115173.7**

(22) Date of filing: **13.07.2000**

(84) Designated Contracting States:

**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**

Designated Extension States:

AL LT LV MK RO SI

(30) Priority: **19.08.1999 DK 113799**

(71) Applicant: **Haldor Topsoe A/S**
2800 Kgs. Lyngby (DK)

(72) Inventors:

- **Ostberg, Martin**
4000 Roskilde (DK)
- **Bak Hansen, Jens-Henrik**
2800 Kgs. Lyngby (DK)
- **Hojlund Nielsen, Poul Erik**
3480 Fredensborg (DK)
- **Aasberg-Petersen, Kim**
2840 Holte (DK)

(54) **Process for pre-reforming of oxygen-containing gas**

(57) Process for the catalytic steam reforming of a hydrocarbon feed stock with a content of higher hydrocarbons and oxygen comprising the steps of catalytic pre-reforming the feed stock and steam reforming the pre-reformed feed stock, the pre-reforming step is carried out in presence of a fixed bed catalyst comprising at least a portion of a noble metal catalyst being active in oxidation of hydrocarbons to carbon oxides and conversion of higher hydrocarbons to methane, wherein the noble metal catalyst is supported on a carrier of MgO and/or MgAl₂O₄ spinel.

EP 1 077 198 A3



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 11 5173

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
Y	DYBKJAER I: "TUBULAR REFORMING AND AUTOTHERMAL REFORMING OF NATURAL GAS - AN OVERVIEW OF AVAILABLE PROCESSES" FUEL PROCESSING TECHNOLOGY, XX, XX, vol. 42, no. 2/03, 1995, pages 85-107, XP000913981 ISSN: 0378-3820 * page 99 - page 100 *	1-4	C01B3/40 C01B3/38
Y	US 4 088 608 A (ITO NOBUEI ET AL) 9 May 1978 (1978-05-09) * column 1, line 57 - line 66 * * column 3, line 6 - column 4, line 14 * * examples *	1-4	
A	WO 98 46523 A (CHIYODA CHEM ENG CONSTRUCT CO ; SHIMURA MITSUNORI (JP); ASAOKA SACH) 22 October 1998 (1998-10-22) * abstract *	1	
P, A	& EP 0 974 550 A (CHIYODA CORPORATION) 26 January 2000 (2000-01-26) * column 10, line 7 - column 15, line 21 *	1	
A	WANG H Y ET AL: "PARTIAL OXIDATION OF METHANE TO SYNTHESIS GAS OVER MGO-AND SiO2- SUPPORTED RHODIUM CATALYSTS" JOURNAL OF CATALYSIS, US, ACADEMIC PRESS, DULUTH, MN, vol. 186, no. 1, 15 August 1999 (1999-08-15), pages 181-187, XP000834800 ISSN: 0021-9517 * abstract *	1	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 17 January 2001	Examiner Van der Poel, W
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons B : member of the same patent family, corresponding document	

EPO FORM 1503 (02.02.99) (P040001)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 00 11 5173

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

17-01-2001

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4088608 A	09-05-1978	JP 52074591 A	22-06-1977
		DE 2657126 A	30-06-1977
WO 9846523 A	22-10-1998	AU 6749198 A	11-11-1998
		AU 6749298 A	11-11-1998
		AU 6749398 A	11-11-1998
		CN 1254323 T	24-05-2000
		EP 0974550 A	26-01-2000
		EP 0974551 A	26-01-2000
		EP 0979799 A	16-02-2000
		WO 9846524 A	22-10-1998
		WO 9846525 A	22-10-1998
		JP 11130404 A	18-05-1999
		JP 11157804 A	15-06-1999
		NO 994912 A	08-10-1999

THIS PAGE BLANK (USPTO)